



**Montgomery County  
Department of Transportation**

**MD 355 / Rockville Pike Crossing Project**

**December 6, 2010**



## Purpose of the Project

The purpose of the project is to:

- Enhance / improve access to mass transit facilities
- Improve the mobility and safety of pedestrians and bicyclists crossing MD 355 / Rockville Pike and improve traffic operations at the intersection of South Wood Road / South Drive / MD 355



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# Project Goals and Objectives

## Primary Goals:

- Improve pedestrian mobility between NNMC, NIH, and Medical Center Metrorail Station facilities through improved crossing of MD 355
- Improve pedestrian safety within the project area by minimizing conflicts with vehicular traffic
- Improve traffic operations to and from NNMC and NIH / Medical Center Metrorail Station at the MD 355 / South Wood Road / South Drive intersection



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# Project Goals and Objectives

## Secondary Goals:

- Promote alternative modes of transportation such as rail, bus, car / vanpool, pedestrian, and bicycle commuting
- Improve efficiency with which emergency and transit vehicles move between the NIH and NNMC campuses





## Preliminary Alternatives

- Alternative 1 – No-Build
- Alternative 2 - TSM/TDM
- Alternative 3 – Grade Separation of MD 355 Under South Wood Road / South Drive
- Alternative 4 - Diamond Interchange
- Alternative 5 - Double Left Turns with Pedestrian/Bicyclist Crossing Options
- Alternative 6 - Southbound Jug Handle with Pedestrian/Bicyclist Crossing Options
- Alternative 7 - Northbound Jug Handle with Pedestrian/Bicyclist Crossing Options



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## Alternatives Retained for Detailed Study

- Alternative 1 – No-Build
- Alternative 2A – Pedestrian / Bicycle Underpass with At-Grade TSM Improvements
- Alternative 2B – Pedestrian / Bicycle Underpass and Deep Elevators with At-Grade TSM Improvements
- Alternative 3 – Grade Separation of MD 355 Under South Wood Road / South Drive





# Evaluation Criteria

## Primary Goals

- Pedestrian / Bicyclist Efficiency
- Pedestrian / Bicyclist Safety
- Traffic Operations
- Bus Operations
- Emergency Vehicle Operations

## Impacts and Costs

- Adjacent Projects
- NNMC Gate
- Construction Impacts
- Natural Environment
- Cultural Resources
- Cost

## Secondary Goals

- Alternative modes of travel would be more attractive to travelers
- Emergency vehicle and bus travel between NIH and NNMC would be more efficient





# Primary Goals



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# Efficiency of Pedestrian and Bicycle Movements Summary

## Alternative 2A

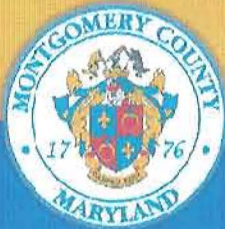
- Decreases travel time for underpass users (68% of 7,530 total users) by 34 seconds
- Total travel time saved = 48.4 hours per day compared to the No-Build (11% improvement)
- Improves access to/from mass transit facility

## Alternative 2B

- Improves travel time for underpass and deep elevator users
- Decreases travel time for Metrorail users (78% of 7,530) by over 2 minutes (139 seconds)
- Total travel time saved = 237.4 hours per day compared to the No-Build (52% improvement)
- Provides the shortest average travel time (deep elevator route)
- Improves access to/from mass transit facility

## Alternative 3

- Decreases travel time for overpass (all) users (100% of 7,530) by 68 seconds
- Total travel time saved = 142.2 hours per day compared to the No-Build (31% improvement)
- Improves access to/from mass transit facility
- Improves travel time for non-Metro pedestrians crossing MD 355



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# Pedestrian / Bicyclist Safety Summary

## Alternatives 2A and 2B

- Decreases pedestrian crossing volumes for those using at-grade crosswalk
- Provides opportunity for 100% avoidance of pedestrian/vehicular conflicts
- Reduces number of conflicts between pedestrians and vehicles at the intersection
- Maintains some conflicts with vehicles and wait times for remaining at-grade crossing users (could be safer if at-grade crossing was eliminated)
- Increases safety for underpass and deep elevator users
- Includes additional safety measures such as lighting, video surveillance, and emergency call boxes in the underpass

## Alternative 3

- Provides opportunity for 100% avoidance of pedestrian/vehicular conflicts
- Completely eliminates conflict points for pedestrians crossing MD 355 at South Wood Road / South Drive
- Creates new crosswalks at each end of the proposed jug handle
- Increases safety for pedestrians crossing South Wood Road / South Drive over MD 355



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# Traffic Operations Summary

## Alternatives 2A & 2B

- Minor capacity enhancements provide a slight improvement over No-Build delay conditions
- Reducing the number of pedestrians crossing MD 355 at-grade would reduce intersection delay during the AM peak
- At-grade pedestrian crossings would prevent the optimal signal timing enhancements needed to improve overall LOS
- Overall peak hour network delays will be slightly higher than the No-Build condition



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# Traffic Operations Summary

## Alternative 3

- LOS and delay for both AM and PM peak periods will improve compared to 2030 No-Build and Alternatives 2A and 2B
- Improving South Wood Road / South Drive traffic operations may impact the network and nearby cross streets.
- Congestion and associated operational issues would be “redistributed,” providing relief for some movements, but potentially worsening others.
- Overall peak hour network delays are projected to increase approximately 10 percent due to the redistribution of traffic patterns.





# Compatibility with Bus Operations Summary

## Alternative 2A / 2B

- Shuttle routes remain the same as the No-Build condition
- Trips from the north experience slightly higher travel times compared to No-Build
- Trips from the south experience slightly lower travel times compared to No-Build
- East/west trips experience slightly lower travel times compared to No-Build except for the PM period

## Alternative 3

- Routes to and from Medical Center Metro Station are different from No-Build
- Reduction in travel time for buses is due to the removal of pedestrian and bicycle movements
- Trips from the north experience shorter travel time compared to No-Build
- Trips from the south experience longer travel time compared to No-Build
- East/west trips experience significant decreases in travel times compared to No-Build except for PM congestion from the east



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# Emergency Vehicle Operations Summary

## Alternatives 2A and 2B

- Routes and travel times same as No-Build

## Alternative 3

- Decreases travel time from the north
- Increases travel time from the south



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# Impacts and Costs



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## Compatibility with Adjacent Projects Summary

Coordination with the following project teams will need to continue for the duration of the project:

State Highway Administration Intersection Improvement Projects:

- MD 355 (Rockville Pike) and Cedar Lane
  - **All build alternatives are compatible with the proposed improvements at the intersection**
- MD 355 (Rockville Pike) and Jones Bridge Road
  - **Alternative 2A/2B: Requires minor limited disruptions associated with MOT and temporary reconstruction of the MD 355 median**
  - **Alternative 3: Requires a temporary reconstruction of the channelized right-turn lane proposed by SHA**

Montgomery County Facilities Study:

- Pedestrian / Bicycle and Transit Stop Enhancements
  - **All build alternatives require temporary relocation and reconstruction of pedestrian facilities along the east side of MD 355**



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# Compatibility with NNMC Gate Operations Summary

- Storage provided under existing conditions is insufficient to meet demand
- Storage provided for processing with Alternatives 2A and 2B is insufficient
- Storage provided for processing with Alternative 3 is sufficient
- Alternatives 2A and 2B operate the same as the No-Build when the MD 355/South Wood Road/South Drive intersection is considered in isolation
- Alternative 3 performs better than the No-Build when the new intersections (MD 355/Jug handle and South Drive/Jug handle) are analyzed in isolation
- The network delay is increased with all alternatives compared to No-Build



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# Compatibility with NNMC Gate Operations – Results

## Required Storage Analysis

- Current Gate Location (Existing)
  - Guard house is approximately 285 feet from the MD 355/South Wood Road intersection
  - Single lane approach to guard house in AM and PM peak period
  - Observed traffic queues from the gate to the MD 355/South Wood Road intersection
  - Observed southbound MD 355 left turning vehicles sometimes queuing into the southbound MD 355 through lanes during the AM peak period
- Proposed Gate Location (2030 No-Build)
  - Guard house will be approximately 125 feet from the MD 355/South Wood Road intersection
  - Two lanes approaching guard house in AM peak period only
  - Available queue storage would decrease below the already insufficient approach to the gate
  - Creating two service lanes approaching NNMC gate may present operational issues between southbound left turning and northbound right turning vehicles

Scenario	Gate Location	# of Lanes	Storage Provided (Feet per Lane)	Calculated Storage Required (Feet per Lane)		% of Required Storage Provided	
				All Traffic Using NNMC Gate	SB Lefts Using NNMC Gate	All Traffic Using NNMC Gate	SB Lefts Using NNMC Gate
2010	Existing	1	285	884	639	32	45
	Relocated	2	125	486	351	26	36
2030 No-Build	Relocated	2	125	510	371	25	34



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# Compatibility with NNMC Gate Operations – Results

## Required Storage Analysis

- Proposed Gate Location (Alternatives 2A and 2B)
  - Guard house will be approximately 125 feet from the MD 355/South Wood Road intersection
  - Two lanes approaching guard house in AM peak period only
  - Available queue storage would decrease below the already insufficient approach to the gate
  - Creating two service lanes approaching NNMC gate may present operational issues between southbound left turning and northbound right turning vehicles
- Proposed Gate Location (Alternative 3)
  - Guard house will be approximately 675 feet from the proposed South Drive intersection with the jughandle
  - Two lanes approaching guard house in both AM and PM peak periods
  - Available queue storage approaching the gate would increase
  - Creating two dedicated service lanes approaching NNMC gate does not present additional operational issues

Scenario	Gate Location	# of Lanes	Storage Provided (Feet per Lane)	Calculated Storage Required (Feet per Lane)		% of Required Storage Provided	
				All Traffic Using NNMC Gate	SB Lefts Using NNMC Gate	All Traffic Using NNMC Gate	SB Lefts Using NNMC Gate
2030 No-Build	Relocated	2	125	510	371	25	34
2030 Alts. 2A/2B	Relocated	2	125	510	371	25	34
2030 Alt. 3	Relocated	2	450 *	510	N/A	110	N/A

\* After 450 feet with two lanes, one lane is provided for an additional 225 feet



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# Construction Impacts Summary

## Alternatives 2A, 2B, and 3

- All existing travel lanes will be maintained during weekday peak hours on MD 355 (some lane closures during off-peak hours would be necessary)
- Compliance with design requirements (including ADA) will be maintained throughout construction
- Efforts will be made to relocate existing bus stops disturbed during construction
- No gate closures are proposed at any time during any construction phase
- Alternatives 2A and 2B require a smaller construction footprint than Alternative 3
- Alternative 3 will require a temporary bridge to be constructed
- MOT costs range from:
  - \$1-2M (Alternative 2A)
  - \$2-3M (Alternative 2B)
  - \$6-7M (Alternative 3)



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# Environmental Impacts Summary

- Natural environment
  - No impacts to wetlands, streams, floodplains, or parks
  - All alternatives cause impacts to trees
- Cultural resources
  - Alternatives 2A and 2B have 0.8 acres of historic property impacts (likely No Adverse Effect)
  - Alternative 3 has 1.3 acres of historic property impacts (could result in an Adverse Effect)





## ROW Impacts and Cost Estimates – Summary

- No displacements, relocations, or impacts to residential or commercial properties anticipated
- Costs include property acquisition, damages, and contingencies to cover unforeseen future costs
- Costs include final design, roadway construction, right-of-way, maintenance of traffic, and utility relocation costs
- Costs do not include operations and maintenance costs
- Pedestrian underpass and elevator construction costs based on July 2009 WMATA Medical Center Metrorail Station Access Improvement Study



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## ROW Impacts and Cost Estimates – Results

Feature		Alternative 2A	Alternative 2B	Alternative 3
<b>Right-of-Way Impacts</b>				
NIH Right-of-Way (acres)		0.60	0.60	3.14
NNMC Right-of-Way (acres)		0.52	0.53	1.23
Total Right-of-Way (acres)		1.12	1.13	4.37
<b>Cost (2010 dollars)</b>				
Design Cost (millions)		\$4 – 6	\$8 – 10	\$8 – 10
Right-of-Way Cost (millions)^	NIH	\$1 – 4	\$1 – 4	\$10 – 20
	NNMC	\$1 – 4	\$1 – 4	\$3 – 7
	Total	\$4 – 8	\$4 – 8	\$15 – 25
Construction Cost (millions)		\$16 - 20	\$38 – 42	\$36 - 40
Total Cost (millions)		\$25 - 31	\$48 - 58	\$58 - 70



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# Secondary Goals



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# Accommodating Alternative Modes of Transportation Summary

## Alternative 2A

- Decreases travel time for Metrorail users, pedestrians, and bicyclists crossing MD 355
- Improves access to/from mass transit facility
- Reducing the number of pedestrians crossing MD 355 at-grade would reduce intersection delay during the AM peak

## Alternative 2B

- Significantly decreases travel time for Metrorail users crossing MD 355
- Decreases travel time for pedestrians and bicyclists
- Improves access to/from mass transit facility
- Reducing the number of pedestrians crossing MD 355 at-grade would reduce intersection delay during the AM peak

## Alternative 3

- Decreases travel time for Metrorail users, pedestrians, and bicyclists crossing MD 355
- Improves access to/from mass transit facility
- Completely eliminating conflicts between pedestrians and vehicles would reduce intersection delay



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# Connectivity Between NNMC and NIH



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# Connectivity Summary

## Alternatives 2A and 2B

- Proposed improvements are similar to the No-Build condition

## Alternative 3

- Proposed improvement creates a direct connection between NIH and NNMC





## Next Steps

- Present Team Recommendation at the BIC meeting on December 21, 2010
- Finalize MHT/Section 106 Coordination
- Complete Environmental Document and submit to FHWA in February 2011
- Meeting to determine lead agency for design/build and development of a MOU for implementation

